

ARENARIA ROSSII AND SOME OF ITS RELATIVES  
IN AMERICA

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Recently, my colleague, Arthur Cronquist, collected a series of an interesting *Arenaria* of the *rossii*-complex in Montana that seemed to require special study. About the same time, William A. Weber sent to me collections from Colorado which bore on a related problem and required further consideration of the status of *Arenaria macrantha* (Rydb.) Nels. (also of the *A. rossii*-complex). Further, a recently published paper by Nannfeldt<sup>1</sup> raised questions as to taxonomic interpretation and status, and the typification and nomenclature of *Arenaria rossii*. All of these circumstances made necessary a review of the matter and require the present statement.

In his discursive paper, Nannfeldt has presented arguments purporting to establish the name (*Minuartia*) *rolfi* to supplant the long-used epithet *rossii*. Examination of historical materials at the British Museum (BM), Kew (K), Fielding Herbarium, Oxford (OXF), Gray Herbarium (GH), and The New York Botanical Garden (NY), and a large body of newly collected specimens on deposit at the National Herbarium (CAN) and the herbarium of the Department of Agriculture (DAO), both at Ottawa, the Gray Herbarium, and The New York Botanical Garden, has convinced us that there is but one polymorphic arctic American species involved, and that all of the Richardson specimens and those of the Parry Voyage belong to it. Accordingly, there is no necessity, or indeed permissibility, for nomenclatural change or substitution, since it is clear that Richardson did in fact effectively and validly publish the epithet *Rossii* (Franklin Journ. p. 738. 1823), and that neither the epithet nor the authorship by Richardson may be displaced.<sup>2</sup>

*Arenaria rossii* in the broad sense extends in the American Arctic from the Eastern Arctic Archipelago and northeast Greenland (also in Spitzbergen, acc. to Nannfeldt) westward to the Bering Straits and the Aleutian Archipelago, and in the moun-

<sup>1</sup> Nannfeldt, J. A. Some Notes on *Minuartia stricta* (Sw.) Hiern. and Allied Species. Nytt. Mag. Bot. 3: 159-170. 1954.

<sup>2</sup> This position was substantially taken by Porsild in Vasc. Pl. West Cana. Arctic Archipelago Bull. 135, Nat. Mus. Cana. p. 110. 1955.



tains in Alaska and Yukon south to Wyoming and Oregon. Clinal modifications take place westerly by which the sepals become acute, the petals narrower and shorter, and the leaves less fleshy. The occidental population has been known as *A. elegans*. The line of phytogeographic division between the two races seems to lie just west of the delta of the Mackenzie River, perhaps to the north of the Richardson Mountains.

In the Mackenzie Range and southward in the Rocky Mountain System, where the species is common, sepals become smaller and broader, petals inconspicuous or lacking, and the leaves remain more or less fleshy. This austral population, the ssp. *columbiana*, extends into Wyoming and Oregon. *Arenaria rossii* seems to be absent from the Middle Rocky Mountains and the Wyoming Basin (both as defined by Fenneman), i.e., from the Uinta and Wasatch Ranges in Utah, and possibly all of Wyoming, except the northernmost portion.

A taxonomic arrangement of the races of *A. rossii*, and a brief consideration of *A. macrantha* and its relatives, the southern complement of *A. rossii*, is provided herewith, and appended is a further provisional key<sup>3</sup> to the species of the *Arenaria rossii*—*A. stricta* complexes of America.

ARENARIA ROSSII Robert Brown apud Richardson.

**A. rossii** ssp. **rossii**.—*A. Rossii* R. Br. apud Richards. Append. Franklin Journ. p. 738. 1823, as to Richardson Arctic specimens; *A. Rossii* R. Br., in *Chloris Melvilliana* p. 14. 1823, as to the Parry Voyage Plants of Melville Island, and "*A. Rossii*, Richardson in Franklin's Journ. p. 738, paulo diversa est statura majore, . . ."; idem, R. Br. in *Suppl. Parry's 1st Voyage* p. 272 (cclxxii), 1824; "*A. rossii*, Brown, *Suppl. Parry's Voy.* cclxxii. No. 20.  $\alpha$  Brown, l.c. nobis non visa.," and " $\beta$  *A. Rossii* Frankl. App. 1 ed. p. 738, No. 170," Richardson, *Append. Franklin Journ.* ed. 2 p. 745. 1823; Hooker *Fl. Bor.—Am.* 1: 100. 1831; *Alsine rossii* Fenzl, *Verbreit. Alsin.* 18. 1833; *Minuartia rossii* (R. Br.) Graebn. *Syn. Mitteleurop. Fl.* 51: 772. 1918; *Arenaria Rossii* R. Br. apud Richards. var. *Daethiana* Polunin, *Bot. Can. East. Arctic Bull. Nat. Mus. Can.* 92: 201. 1940; *Minuartia rolfii* Nannfeldt, *Nytt. Mag. Bot.* 3: 161. 1954.

In the northernmost part of its range, the subsp. *rossii* is characteristically a densely and closely pulvinate plant, infrequently flowering, and probably often reproducing vegetatively by means

<sup>3</sup> For a key to the genus see: Maguire, B., *Arenaria in America North of Mexico. A Conspectus.* *Am. Mid. Nat.* 46: 494–498. 1951.



of easily detached short shoots borne in the axils of the primary leaves (discussed at length by Nannfeldt, l.c.). The type specimens of *Minuartia rolfii* Nannf. (*Simmons 2390*) are of this form.

More westerly, and perhaps generally in more protected places, particularly on the mainland, the plant tends to become more loosely tufted and, as observed by Porsild (in correspondence) flowers abundantly, and presumably matures seed. The specimens of Richardson represent both forms.

The specimens of Richardson (No. 170, the types of *A. rossii*) collected on "Barren Grounds from Point Lake to the Arctic Sea," of which we have seen the material at Kew, the British Museum, the Gray Herbarium, the Oxford Fielding Herbarium, and The New York Botanical Garden, consist both of densely pulvinate and more loosely tufted specimens. Melville Island plants of the Parry Voyage, seen at the British Museum and Fielding Herbarium, are of the pulvinate form.

TYPE or arctic exploration specimens seen: coast, British North America, Dr. Richardson [170] 1819-22, "*Arenaria Rossii* Br.," (holotype, BM, photo CAN, the holotype sheet consisting of six specimens all of the more compact form); second sheet with three specimens (BM); "Arctic America, Frankl. Exp. (GH 2 sheets, K), the tufted form; [Franklin Journ.] No. 170, Richardson (GH, NY), the tufted form; Melville Island, "Parry's 1 Voy. No. 20. *Chloris Melvilliana* p. 14. 1823." (BM, OXF), the pulvinate form. Ad Barren Vallies (lat. 76° 37', long. 84° 25') sinus Harbour Fjord, Ellesmerelandiae meridionalis in campis argillosis, July 28, 1900, *H. G. Simmons 2390* (GH, NY, isotypes of *M. rolfii* Nannf.).

DISTRIBUTION. Barren lands at low altitude, West Greenland, the Arctic Archipelago and the arctic coastal mainland to the Mackenzie River.

REPRESENTATIVE SPECIMENS. **Greenland:** Jacobsen Bay, Ymer Island, Aug. 11, 1932, *T. Sørensen 3312* (CAN); Dragon Point (82° 15' N.), July 19, 1917, *Th. Wulff s.n.* (GH). CANADA. ARCTIC ARCHIPELAGO. **Baffin Island:** Arctic Bay, Sept. 8-11, 1936, *Polunin 2587* (GH); ? Cape Dorset, July 29, 1938, *Manning & Manning 19* (CAN); Hantzsch River, Sept. 3, 1938, *Manning & Manning 182* (CAN); Silliman Mt., July 11, 1948, *Senn & Calder 3924* (DAO), with characters of ssp. *elegans*. **Ellesmere Island:** Harbour Fjord, July 28, 1900, *Simmons 2390* (GH, NY, isotypes *Minuartia Rolfii* Nannf.); Craig Harbour, Sept. 16-17, 1934, *Polunin 872* (CAN); Eggerton Lake, Aug. 17, 1951, *MacDonald 18* (CAN); Hawkins Lake, July 17, 1951, *Bruggemann 202* (DAO); Parr Inlet, Aug. 8, 1951, *Bruggemann 252* (DAO); Wood Creek, Aug. 13, 1951, *Bruggemann 262* (DAO); Ward Hunt Island off n. coast Ellesmere I., 83° N., July 14, 1954, *Christie 50* (CAN). **Devon Island:** Dundas Harbour, Sept. 7, 1936, *Polunin 2554* (CAN). **Prince Charles Island:** Foxe



Basin, Aug. 15–18, 1949, *Baldwin 1939* (CAN). **King William Island:** 68° 47' N., 97° 40' W., Aug. 10, 1949, *Woodruff 144* (DAO); Victory Point, Aug. 8, 1954, *Cooper 112* (CAN); Aug. 17, 1955, *Cooper 151* (CAN). **Grinnell Land:** Lady Franklin Bay, *Greely 50* (GH). **Victoria Island:** Wollaston Pen., July 27, 1949, *Porsild 17216* (CAN); Holman Island trading post, Aug. 8, 1949, *Porsild 12278* (CAN); Albert Sound, Aug. 4, 1949, *Porsild 17384* (CAN). **Banks Island:** Cape Lambton, July 30, 1949, *Porsild 17554* (CAN); n.e. corner of island, Aug. 13–20, 1949, *Porsild 17667* (CAN); Bernard Island, Aug. 22, 1949, *Porsild 17749* (CAN); De Salis Bay, July 17, 1952, *Manning & Macpherson 16* (CAN). **Cornwallis Island:** Resolute Bay, July 31, 1949, *Collins 192* (CAN); 75° 15' N., 96° 20' W., in 1952, *Mackay 8* (CAN); Resolute Bay, July 30, 1949, *Schofield 446* (DAO). Melville Peninsula, Repulse Bay, July 25, 1950, *Bruggemann 69* (DAO). Spruce Bay, July 23, 1951, *Chillcott 56* (DAO). KEEWATIN DISTRICT. **Southampton Island:** South Bay, Aug. 22, 1936, *Polunin 2280* (GH), *2282* (GH); July 9, 1948, *Cody 1231B* (DAO); July 25, 1948, *Cody 1558* (DAO); July 28, 1948, *Cody 1637* (DAO); July 29, 1948, *Cody 1653* (DAO); Aug. 5, 1948, *Cody 1855* (DAO); Aug. 11, 1948, *Cody 2016* (DAO); July 15, 1948, *Cody & Senn 1338* (DAO); Ford River, Aug. 15, 1950, *Brown 213* (DAO). MACKENZIE DISTRICT. Bernard Harbour, Aug. 1915, *Johansen 367* (CAN); Great Bear Lake, Aug. 2, 1928, *Porsild & Porsild 5140* (CAN); Tree River, July 11, 1955, *Miller 94* (CAN); Coppermine, Aug. 4, 1951, *Findley 252* (DAO).

**A. rossii** subsp. **elegans** (Cham. & Schlecht.) Maguire, comb. nov. *Arenaria elegans* Cham. & Schlecht. *Linnaea* **1**: 57. 1826.

TYPE. Ad sinum St. Laurentii inter muscos et Dryadem crescens, *Chamisso no. 13*, p. 57, l.c.

DISTRIBUTION. Coastal and montane Alaska and Yukon of the Yukon River drainage. Variable. Specimens with flat ascending leaves 8–10 mm long and small flowers (sepals ca. 2.5 mm long), represented by *A. & R. A. Nelson 4080*, and *L. Viereck 1400* from Mt. McKinley National Park, and other like specimens, probably constitute a discrete well segregated variety.

REPRESENTATIVE SPECIMENS. CANADA, MACKENZIE DISTRICT. Richardson Mts., Aug. 15–17, 1933, *Porsild 6792* (CAN), *6793A* (CAN); Mackenzie Range, Sept. 9, 1944, *Porsild & Breitung 11804* (CAN); Canol Rd., Mile 111 east, July 25, 1944, *Wynne-Edwards 8294* (CAN). **Yukon Terr.:** Canol Rd., Mile 132, June 15, 1944, *Porsild & Breitung 9609* (CAN); Canol Rd., Mile 105, July 21, 1944, *Porsild & Breitung 10891* (CAN). **Alaska.** Miller House, 115 miles n. Fairbanks, July 22–28, 1936, *Scamman 168* (GH); July 24, 1947, *Scamman 482* (GH); July 14, 1947, *Scamman 4695* (GH). Brooks Range, *Jordal 3605* (CAN). Eagle Summit: July 7–11, 1937, *Scamman 756* (GH); July 12–28, 1940, *Scamman 2074* (GH); Aug. 1–9, 1940, *Scamman 2247* (GH); June 23–30, 1945, *Scamman 3514* (GH); July 13–15, 22–23, 1949, *Scamman 5195* (GH); June 25, 1948, *Lepage 23277* (CAN, DAO). White Mts., July 7, 1953, *Gjaerevoll 456* (CAN). Alaska Range, June 19, 1926, *Porsild & Porsild 225* (CAN). Mt. McKinley Nat. Park: Aug. 8, 1939, *A. & R. A. Nelson 4080* (GH, NY); July 17, 1956, *Viereck 1400* (COLO, NY); July 10, 1956, *Viereck 1191* (COLO, NY). Seward Peninsula: Cape Nome, in 1900, *F. E. Blaisdell s. n.* (GH, NY); Upper Kougarok River, June–July, 1909, *C. B. Atwater s. n.* (GH); Nome, Aug. 6–10, 1926, *Porsild & Porsild 1336* (CAN,



GH); Nome, Anvil Hill, Aug. 6-10, 1926, *Porsild & Porsild 1334* (CAN), *1335* (CAN, GH); Bluff, Aug. 5-6, 1926, *Porsild & Porsild 1222* (CAN); Nome, Anvil Hill, Aug. 9, 1948, *Lepage 23895* (CAN, DAO); Nome, June 20, 1951, *Whillans 52* (DAO). Norton Sound, July 16-29, 1926, *Porsild & Porsild 984* (CAN, GH). Port Clarence, Aug. 6-20, 1949, *Scamman 5481* (GH).

**A. rossii** subsp. **columbiana** (Raup) Maguire comb. nov. *A. rossii* var. *columbiana* Raup, Contr. Arnold Arboretum **6**: 157. 1934.

TYPE. Wet stones in sun at 5500 ft., Pass n. of Robb Lake, British Columbia, Mrs. J. Norman Henry *262* (GH).

DISTRIBUTION. The petaliferous element, montane, the Stikine Mountains, Yukon, south in the Rocky Mountains to Colorado.

REPRESENTATIVE SPECIMENS. CANADA. **British Columbia.** N. Kootanie Pass: July 29, 1883, *Dawson 656A* (CAN); *Dawson 665* (CAN); Rainbow Mts., July 16, 1898, *Spreadborough 19291* (CAN, GH); Robb Lake, July 25, 1932, *Henry 262* (GH, holotype of *A. rossii* var. *columbiana* Raup); Mt. Selwyn, July 19, 1932, *Raup & Abbe 3951* (CAN, GH, NY); *Raup & Abbe 3761* (CAN, GH); Laurier Pass, July 22, 1935, *Henry 718* (GH); Alaska Highway, Mile 456, *Porsild 9010* (CAN). **Alberta.** Moose Mt., June 29, 1897, *Macoun 18266* (CAN, GH); July 1, 1897, *Macoun 18267* (CAN); Crow's Nest Pass, Aug. 2, 1897, *Macoun 18270* (CAN); June 30, 1897, *Macoun 268* (CAN); Saddle Mt., Banff Nat. Park, July 31, 1891, *Macoun 4868* (CAN); Waterton Lake, July 11, 1931, *A. S. Pease 22570* (GH); Banff Nat. Park, July 13-22, 1946, *Porsild & Breitung 15886* (CAN); *15977* (CAN).

**A. rossii** subsp. **columbiana** var. **apetala** Maguire, Am. Mid. Nat. **46**: 510. 1951.

TYPE. Alpine meadow, Preston Park, alt. 7520 feet, Glacier Park, Montana, July 20, 1932, *Maguire 732* (holotype NY).

DISTRIBUTION. The apetalous element, forming extensive local populations, British Columbia, Alberta, Montana, and possibly northwestern Wyoming. Commonly more compact, and more frequently collected than the preceding. A single collection is known from the Wallowa Mts., Oregon, and a diminutive specimen, *J. T. Howell 22773* from Mono Mesa, Inyo Co., Calif., has seed and flower characteristics of the var. *apetala*, and is tentatively assigned here.

REPRESENTATIVE SPECIMENS. CANADA. **Yukon Terr.,** Canol Rd., Mile 102, July 19, 1944, *Porsild & Breitung 10615* (CAN). **Alberta.** Crow's Nest Pass, Aug. 2, 1897, *Macoun 18271* (CAN), *18296* (CAN); July 31, 1897, *Macoun 18271* (CAN). Upper Red Deer River: July 12, 1951, *Porsild 18175* (CAN); July 12, 1951, *Porsild 18306* (CAN). Coleman, July 6, 1956, *Porsild & Lid 19351* (CAN). Mt. Inglismoldie, July 1, 1916, *Lewis 296* (CAN). Banff Nat. Park, *Porsild & Breitung* in 1945; Sulphur Mt., *12432* (CAN); Mt. Temple, *12554* (CAN); Sunshine Ski Lodge, *13161* (CAN); *13423* (CAN); *13469* (CAN); *31470* (CAN); *14102* (CAN); *15885* (CAN); Mt. Bourgeau and Mt. Brett, *13802* (CAN); Cascade River, *14950* (CAN); Upper North Saskatchewan River, *16056* (CAN); Brewster Hill, *19464* (CAN); Citadel Mt., *19555* (CAN); Sulphur Mt., June 14, 1906, *S. Brown 146* (GH, NY). Waterton Lake: Sheep Mt., July 28, *Macoun 10098* (CAN); Sept. 6, 1953, *Moss 10516* (CAN); Carthew Pass, July 26, 1953, *Breitung 16689* (NY). Jasper Nat.



Park, Medicine Lake, Aug. 7-9, 1941, *Scamman 2528* (GH). UNITED STATES: **Montana.** Glacier Nat. Park: Mt. Jackson, Aug. 24, 1920, *Somes 70* (NY); Piegan Pass, July 20, 1930, *Pease 22194* (GH); Preston Park, July 20, 1932, *Maguire 732* (NY, holotype *A. rossii* var. *apetala* Maguire); Logan Pass, July 16, 1934, *Jones 5523* (GH). Mt. Henry, Midvale, July 16, 1903, *Umbach 405, in part* (NY). Beaverhead Co.: Black Lion Mt., July 30, 1945, *Hitchcock & Muhlick 12908* (NY). Big Snowy Mts., July 6, 1945, *Hitchcock & Muhlick 12037* (NY); Pintlar Peak, July 27, 1945, *Hitchcock & Muhlick 12860* (NY). Bridger Mts., June 5, 1897, *Rydberg & Bessey 4050* (NY, 2 sheets). Big Horn Mts., July 1898, *Tweedy 162* (NY); Beartooth Mts., Carbon Co., July 29, 1955, *Cronquist 8003* (NY, GH, US, UC, WS, WTU, COLO, K, P). **Oregon.** Wallowa Mts. July 31, 1899, *Cusick 2299, in part* (GH). **Wyoming.** Northwestern Wyoming Expedition, in 1873, *Parry 40* (GH).

#### ARENARIA MACRANTHA AND ITS RELATIVES

As shown above, *Arenaria rossii*, occupying the American trans-Arctic region and northern Rocky Mountains, apparently does not extend into the Middle Rocky Mountain area of Wyoming and Utah (the Uinta and Wasatch Ranges), or the Wyoming Basin. Apparently the range of *A. macrantha*, which replaces *A. rossii* in the south, and its relatives are confined to the southern Rocky Mountains and Colorado Plateau region (as defined by Fenneman) and do not occur in the Middle Rocky Mountain area. Thus, the Middle Rockies form a broad spacial hiatus between the ranges of the two closely related complexes.

From the material of the complex now available, two elements stand out more strongly, viz., that represented by the specimens of the type collections of *A. macrantha* from Montezuma County, Colorado, and of *A. filiorum* from Iron County, Utah.

***Arenaria macrantha*** (Rydb.) Nels. Man. Bot. Rocky Mts., p. 186. 1909. *Alsinopsis macrantha* Rydb. Bull. Torrey Club 31: 407. 1904.

TYPE. Common alpine form, Little Kate Basin, La Plata Mts., Montezuma Co., Colorado, July 14, 1898, *Baker, Earle & Tracy 678* (holotype NY, isotype NY).

The types, consisting of four plants on two sheets at The New York Botanical Garden, are luxuriant specimens, obviously perennial, with numerous procumbent stems to 10 cm long; conspicuous flowers borne in 3 (5)-flowered cymes; sepals broadly lanceolate, 4.5-5.0 mm long, 2 mm broad, acuminate, strongly 3-nerved; petals conspicuously exceeding the sepals, 7-8 mm long; and leaves more or less plane, strongly 1-nerved, blunt. No mature capsules had been formed, consequently seeds are lacking. Collections recently obtained show the species, as expected, to be somewhat variable in habit, leaf-form, and range of flower size. Two of them have formed mature capsules and seed.



Adequate circumscription is now possible: leaves may be more or less plane (as in the types) or triquetrous-subulate; sepals 4.0–5.5 mm long; petals ordinarily conspicuously surpassing the sepals; seed reniform ca. 1 mm broad, tessellate-tuberculate, blackish.

**DISTRIBUTION.** Alpine or similar habitats, mountains of the Southern Colorado Rockies.

Representative specimens, Colorado. Gray's Peak, *A. Eastwood s.n.*, in July 1888 (COLO); alpine, South Park, *Wolf & Rothrock 346* (GH). Park Co., Hoosier Ridge, *Weber, Rollins & Livingston 655* (COLO); tundra, North Star Mountain, Hoosier Pass, ca. 12,300 ft. alt., *Weber 8751* (COLO); Bald Mt., 11,500 ft., Aug. 1898, *E. A. Bessey s.n.* (NY); Bald Mt., Aug. 28, 1954, *Jean Langenheim 3968* (COLO). Clear Creek Co. *Weber & Dahl 8613*, depauperate specimens, (COLO). Gunnison Co. Travertine bog and cliffs, Cement Creek Canyon, ca. 8500 ft., *Weber & Langenheim 9520* (COLO); Horse Basin, 11600 ft., *Langenheim 70* (COLO); alpine, Comanche Creek at 12000 ft., *Langenheim 1361* (COLO). Pitkin Co. ridge east of Avalanche Creek, 12000 ft., *Langenheim 2106* (COLO, NY). Montezuma Co. Little Kate Basin, *Baker, Earle & Tracy 678* (holotype NY, isotype NY). San Juan Co. Near Irontown, July 21–31, 1899, *C. C. Curtis s.n.* (NY).

*Hall & Harbour No. 69*, Lat. 39°–41°, Colorado, in 1862 (GH), an apetalous form with 1–3-flowered cymes and reddish slightly sculptured seed, can hardly be assigned to *A. macrantha*. It is similar to a few scattered collections obtained from the Northern Rocky Mountains and Canadian Rocky Mountains (viz.: *Porsild & Breitung 10615* (CAN), an apetalous form from Mile 102, Canol Road, Yukon Terr.; and *Spreadborough 19290* (CAN), Rainbow Mt., Fraser River, B. C., petalous form), which are rare, sporadic and do not form populations, and have for the time being been assigned to *A. rossii* subsp. *columbiana*.

***Arenaria filiorum*** Maguire, Bull. Torrey Club **73**: 326. 1946.

**TYPE.** Common, gravelly beach, Navajo Lake, Iron County, Utah, July 13, 1940, *Maguire 19472* (holotype NY, isotype GH, UTC, UC).

Small glabrous annual from a slender taproot, with cymes usually bearing 3–5 flowers; sepals are ovate-lanceolate, strongly 3-nerved, and are 3.5–4.8 mm long; petals more or less equaling or shorter than the sepals; seed abundantly produced 0.7–1.0 mm broad, reniform, very dark reddish brown or blackish, rather strongly sculptured (in contrast to the seed of *A. rossii*).

This highly distinctive form occurs intimately with *A. rubella*, where both hold dominance on the gravelly beach of the lake. Quite similar plants, *L. Ellison 4523* (NY), Island Lake, San Pete County, were collected also on gravelly lake beaches.

Elsewhere from the high Colorado Plateau of Utah, viz., *Maguire 19988* (NY), 10928 ft. alt., Mayfield Canyon, and *Maguire 20060* (NY), 12000 ft. alt., Horseshoe Mt., both in San Pete County, and *Maguire*



20097 (NY), East Brian Head Peak, 11000 ft. alt., Iron County, are somewhat similar plants but obviously perennials. They most closely resemble small-flowered members of the complex cited above from Colorado, but are distinguishable in minor ways from them.

A series of specimens obtained from the Charleston Mts., Clark Co., Nevada, *Clokey 5460* (NY), *7510* (NY), and *7923* (NY), collected in 1935, 1937 and 1938 respectively, are obviously perennial with commonly uniflorous cymes. They were initially assigned to *A. filiorum* but are easily recognizable as distinct from it. They are extremely uniform and certainly form a geographically restricted race, yet undoubtedly belong to the *A. macrantha-filiorum* complex.

A KEY<sup>4</sup> TO THE ARENARIA ROSSII-A. STRICTA<sup>5</sup> COMPLEXES AND  
THEIR RELATIVES IN NORTH AMERICA

1. Seed reniform (with respect to the hilum), hence broader than long; plants completely glabrous.
2. Seed smooth or inconspicuously ornamented (under  $\times 10$  magnification), pale, reddish, 0.5–0.7 mm broad, cymes uniflorous, ebracteate. . . . . *A. rossii*.
3. Sepals commonly 1.5–2.5 (3.0) mm long, oblong-ovate, obtusish, usually 1-nerved;<sup>6</sup> petals conspicuously surpassing the sepals; cymes uniflorous, ebracteate; pedicels 5–20 mm long; leaves fleshy, subulate, obtuse, 2–4 mm long; densely pulvinate or tufted plants of (Spitzbergen and) Arctic America; Greenland, Arctic Archipelago, and Arctic Coastal America to the Mackenzie River Region. . . . . *A. rossii* subsp. *rossii*.
3. Sepals commonly 3.0–3.5 mm long, lanceolate, acute, commonly 3-nerved; pedicels 2–4 (5) cm long; leaves less fleshy, more or less plane, acutish, petals narrower, equaling or commonly somewhat shorter than the sepals; loosely tufted plants of Alaska, Yukon in the Yukon River drainage, and probably the Richardson Mountains. . . . . *A. rossii* subsp. *elegans*.

<sup>4</sup> This "key" is intended to supplement, by introducing some corrections and additions, the key offered by me in 1951 (l.c.). In no sense do I mean to imply that the species herein admitted are necessarily more strongly intra-related, than to or with other members of the Sect. *Alsine*.

<sup>5</sup> Dr. A. E. Porsild in correspondence of Aug. 6, 1957, wrote, "I wonder if you are not overlooking that *Mimuartia stricta* (Sw.) Hiern. is not the same as *Arenaria uliginosa* Schleich and certainly not synonymous with *A. stricta* ssp. *dawsonensis* as suggested by you (1951)." Both from lack of material and opportunity to extend the present study, I cannot have a competent self-gained opinion on the point. In view of Dr. Porsild's broad knowledge of boreal American plants, and his careful study, I am quite content to accept his interpretation of plants so indicated by him. Obviously, this would require the addition of *A. uliginosa* to my "key" of 1951; and indeed also *A. macrantha* (Rydb.) Nels., there inadvertently omitted by me.

<sup>6</sup> Anatomically the sepals in the entire complex are 3-nerved. The lateral nerves may be prominent, or weakly developed. Or, the lateral nerves may be obscured, in more crassulous sepals, by relatively thicker mesophyll tissues, thus in appearance the sepal becoming "1-nerved." The terms "3-nerved" or "1-nerved" merely give expression for relative prominence of the lateral nerves.



3. Sepals 2.5–3.5 mm long, lanceolate or ovate-lanceolate, acutish, moderately or weakly 3-nerved, or often 1-nerved; petals inconspicuous, narrow, shorter than the sepals, often lacking; leaves more or less fleshy, triquetrous or subulate; Rocky Mountains from the Stikine Mountains south to Oregon and northern Wyoming. . . . . *A. rossii* subsp. *columbiana*.
4. Petals present . . . . . var. *columbiana*.
4. Petals lacking . . . . . var. *apetala*.
2. Seed obviously tessellate-tuberculate (under  $\times 10$  magnification), blackish, (0.8) 1.0–1.5 mm broad; cymes commonly 3-several-flowered, bracteate; sepals strongly 3-nerved.
  5. Stems mostly under 10 cm high (or long), the inflorescence shorter than the vegetative portion of the stem, cymes commonly 3–5-flowered.
  6. Plants glabrous.
    7. Obviously perennial; cymes 1–3-flowered, flowers large, showy; sepals 4.0–5.5 mm long, lanceolate, acute; petals commonly exceeding the sepals, to 8 mm long; plants rather densely tufted; mountains of central and southern Colorado and the type collection from the La Plata Mountains, Colorado. . . . . *Arenaria macrantha*.
    7. Annual or weakly perennial; flowers not showy; cymes 3–7-flowered; sepals 4.0–5.5 mm long; petals shorter than the sepals; apparently restricted to the high Colorado Plateau of southcentral Utah. . . . . *A. filiorum*.
  6. Plants conspicuously glandular; circumboreal. . . . . *A. rubella*.
  5. Stems 10–30 cm high; primary leaves 1–2 cm long; inflorescence characteristically exceeding the hyaline portion of the stem; sepals 3.5–5.0 (6.5) mm long, 3-nerved, rarely 1-nerved; petals 5–8 mm long; seed 0.8–1.5 mm broad. . . . . *A. stricta*.
    8. Plants totally glabrous, strongly perennial.
      9. Petals conspicuously surpassing the calyx; capsule equal to or shorter than the calyx.
      10. Stems leafy for more than half their length; primary leaves usually 1.5–3.0 cm long; plants mostly lax, frequently matted. . . . . *A. stricta* subsp. *stricta*.
      10. Stems leafy usually below the middle; primary leaves mostly 0.5–1.5 cm long; plants rigid, not matted. . . . . *A. stricta* subsp. *texana*.
    9. Petals equal to or mostly shorter than



- the calyx; capsule exerted. ....  
 ..... *A. stricta* subsp. *dawsonensis*.
8. Plants glandular-pubescent, at least in the  
 inflorescence, weakly perennial. ....  
 ..... *A. stricta* subsp. *macra*.
1. Seed oblong (with respect to the hilum), hence longer than  
 broad.
11. Primary leaves 3-nerved, non-glaucous; inflorescence  
 stipitate-glandular, half or less than half the length  
 of the glandular stem; sepals 3.5–6.5 mm long; ovules  
 9–15; seed several or solitary, oblong, 1.0–1.3 mm  
 broad, 1.25–2.0 mm long; widespread in the Rocky  
 Mountain, Intermontane, and Cascade-Sierra Nevada  
 region of western America, in the mountains from  
 British Columbia and Alberta to California, Nevada,  
 Utah and Colorado. .... *A. nuttallii*.
12. Leaves ascending or strict, neither arcuate nor squar-  
 rose.
13. Leaves abruptly acute or apiculate, infrequently  
 pungent; sepals acuminate, midrib not promi-  
 nent.
14. Petals shorter than the sepals; Cascade  
 Range, Rocky Mountains. ... *A. nuttallii* subsp. *nuttallii*.
14. Petals longer than the sepals; north Cali-  
 fornia coast ranges, Siskiyou Mountains. ...  
 ..... *A. nuttallii* subsp. *gregaria*.
13. Leaves strongly pungent; sepals narrow, pun-  
 gently attenuate, midrib prominent; Sierra  
 Nevada Range. .... *A. nuttallii* subsp. *gracilis*.
12. Leaves arcuate or squarrose.
15. Sepals 3.5–5.5 (6.0) mm long, lanceolate,  
 sometimes broadly so, acuminate, 1-  
 nerved (occasionally 3-nerved); petals  
 shorter than the calyx; Cascade Range,  
 Rocky Mountains. .... *A. nuttallii* subsp. *nuttallii*.
15. Sepals 5.5–6.6 mm long, narrowly lanceo-  
 late, pungently attenuate, 3-nerved;  
 petals more or less equaling the calyx;  
 central Great Basin. .... *A. nuttallii* subsp. *fragilis*.
11. Primary leaves 1-nerved; glaucous; inflorescence diffuse,  
 exceeding the length of the glabrous stem; sepals 3.0–  
 4.5 mm long; ovules 6 (7); seed solitary, 1.4–1.5 mm  
 broad, 2.3–2.8 mm long; plants of serpentine areas,  
 Coast Ranges, Trinity County, California. .... *A. rosei*.